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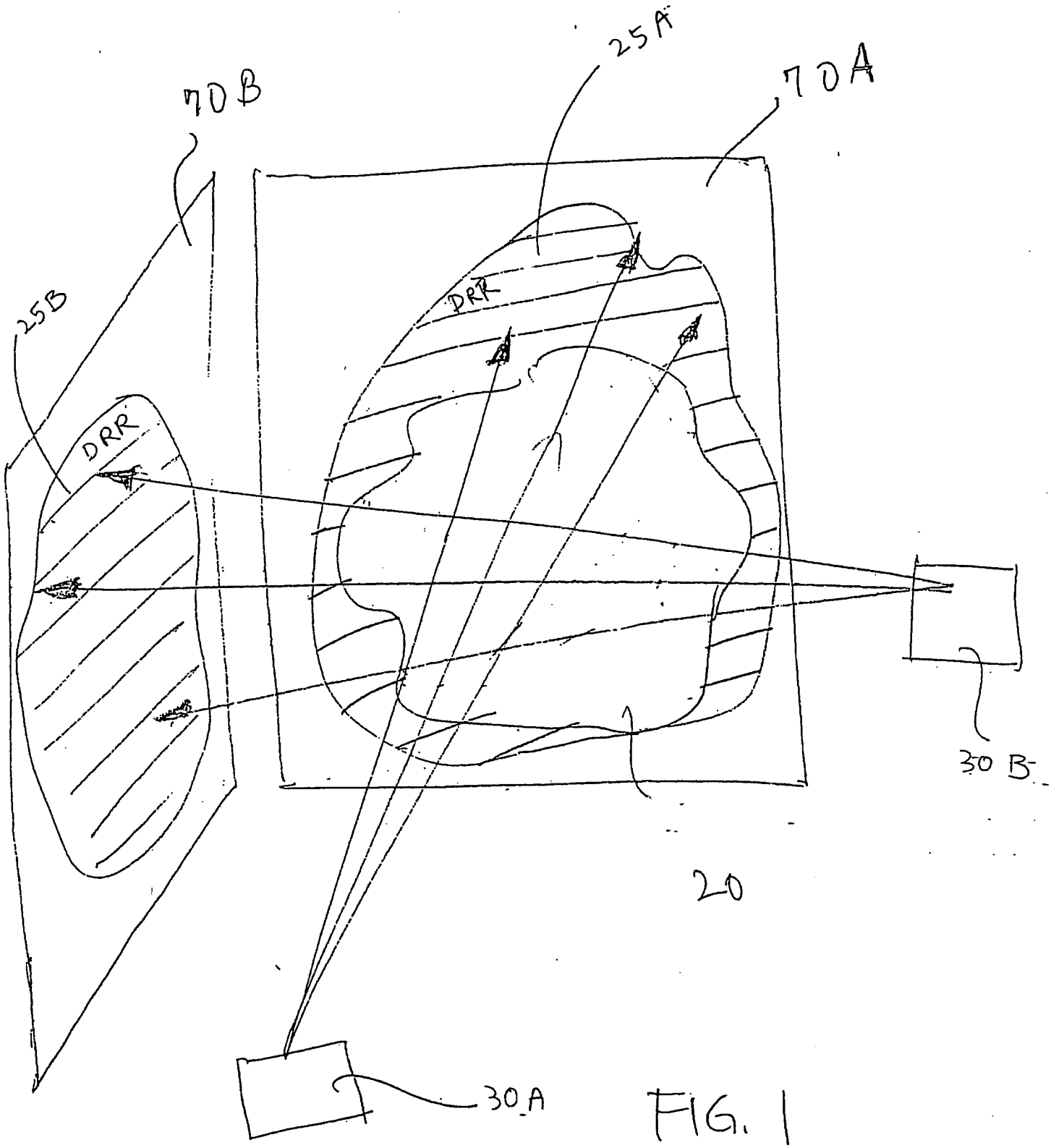

FIG. 1

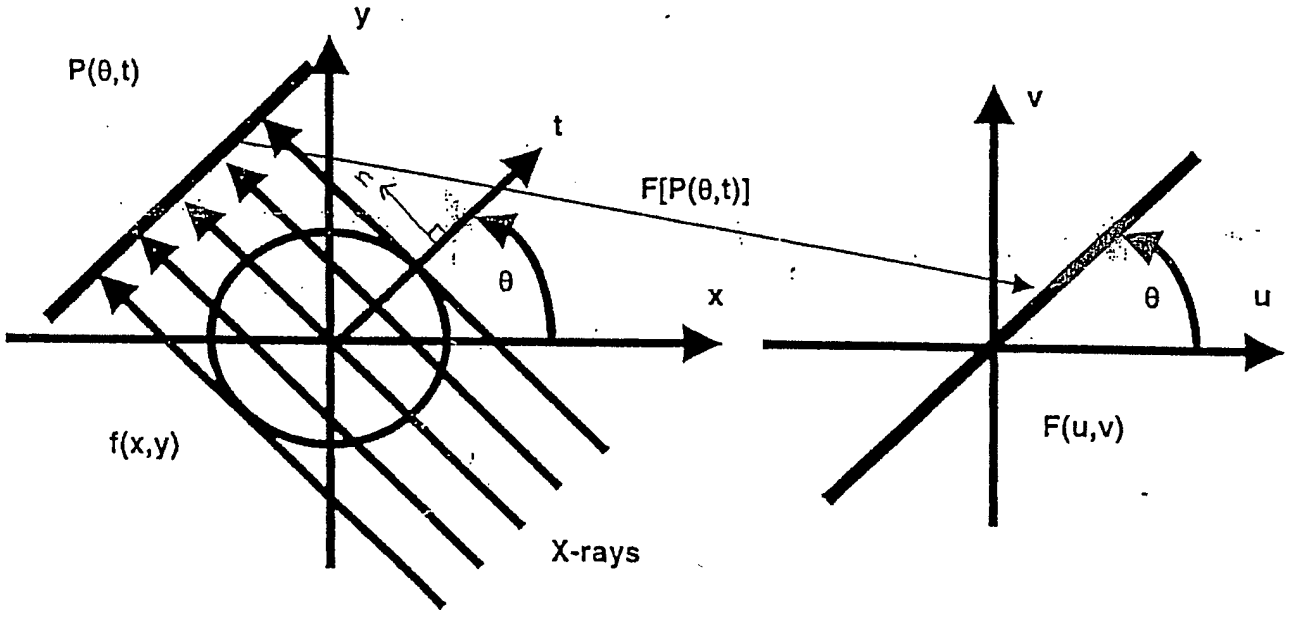

FIG. 2

2D FOURIER SLICE THEOREM

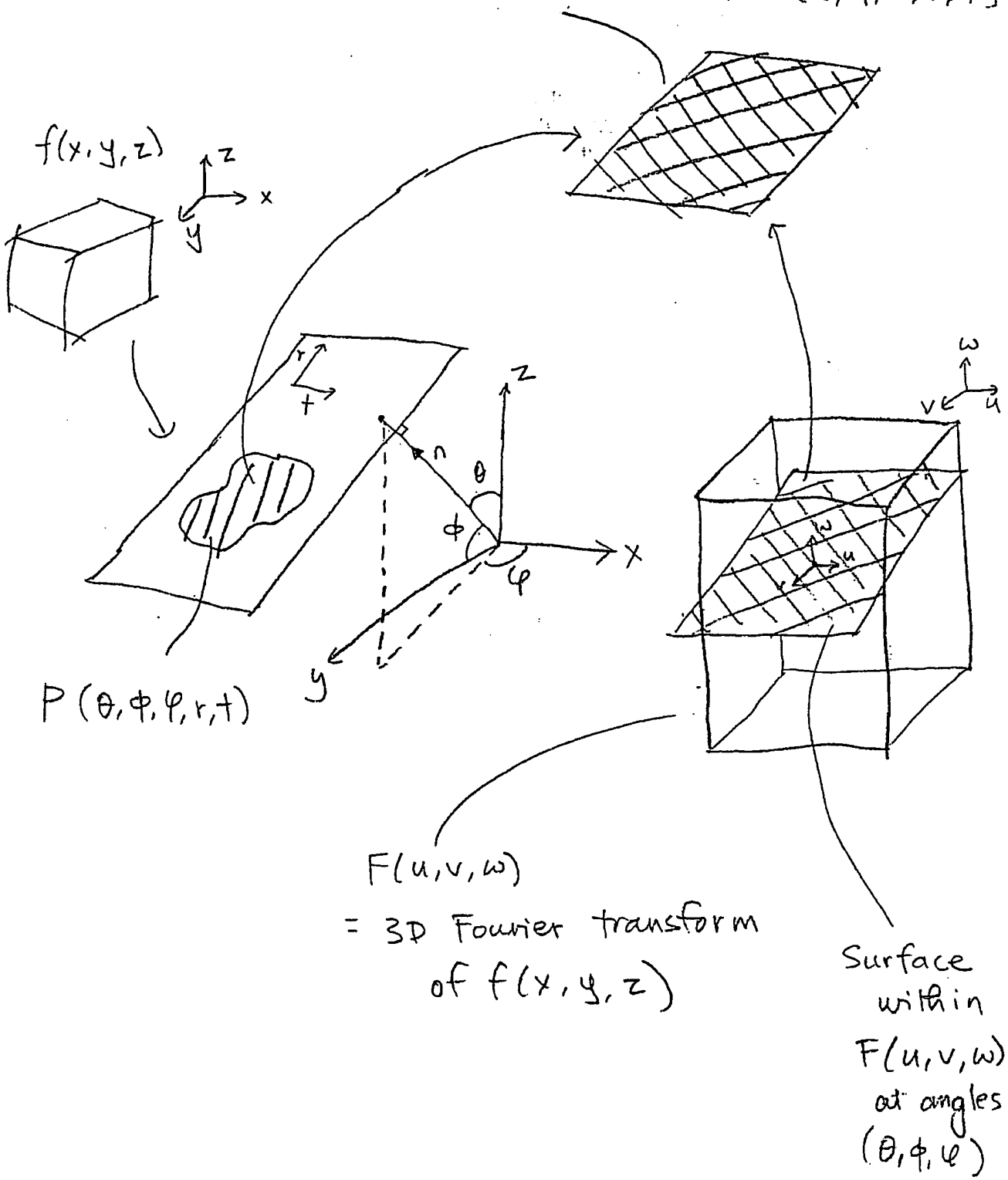

FIG. 3

3D Fourier Slice Theorem

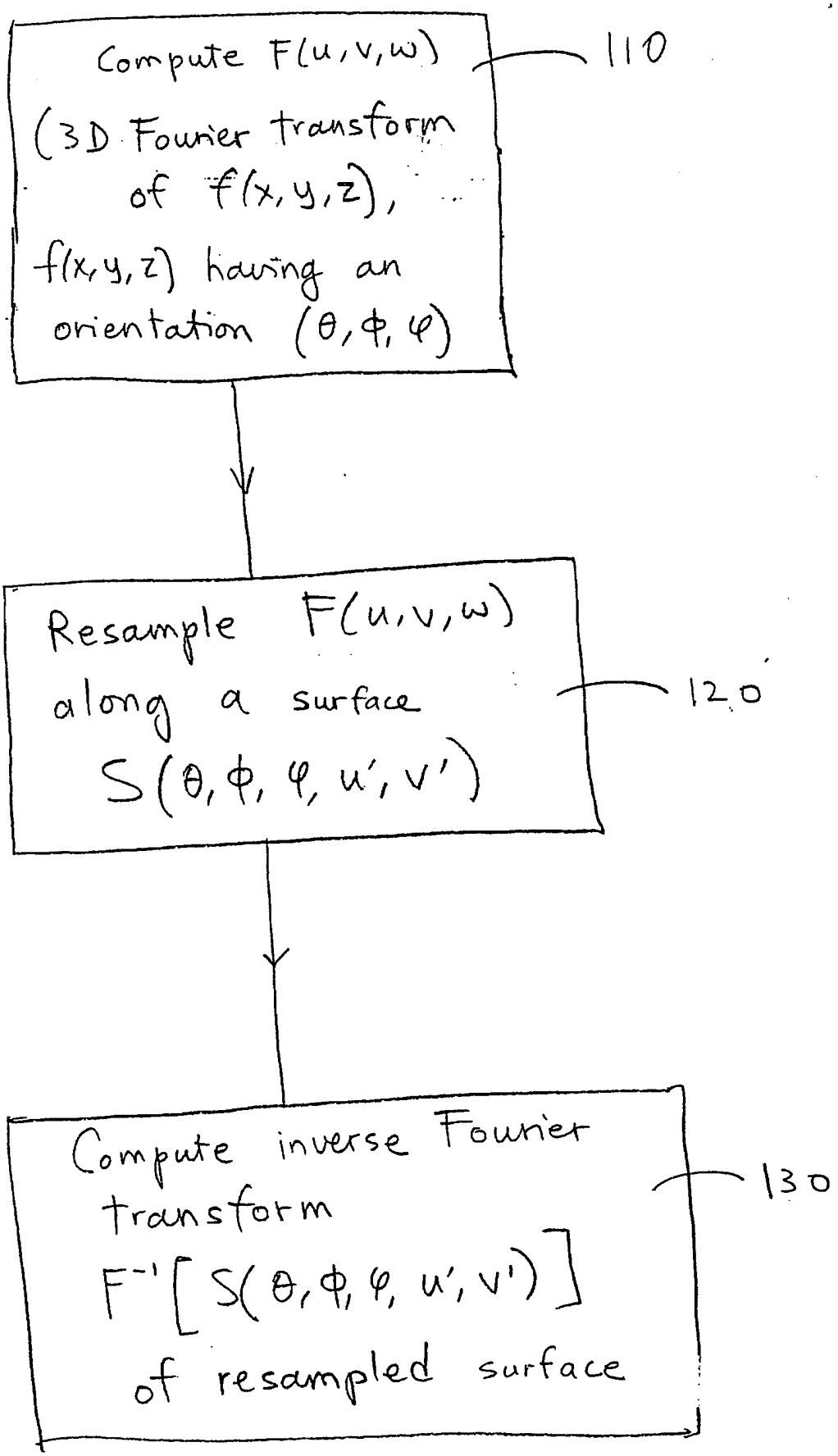
Compute F(u,v,w)
(3D Fourier transform of f(x,y,z),
f(x,y,z) having an orientation (θ,φ,φ)
110
Resample F(u,v,w) along a surface S(θ,φ,φ,u',v')
120
Compute inverse Fourier transform F⁻¹[S(θ,φ,φ,u',v')] of resampled surface
130

FIG 4

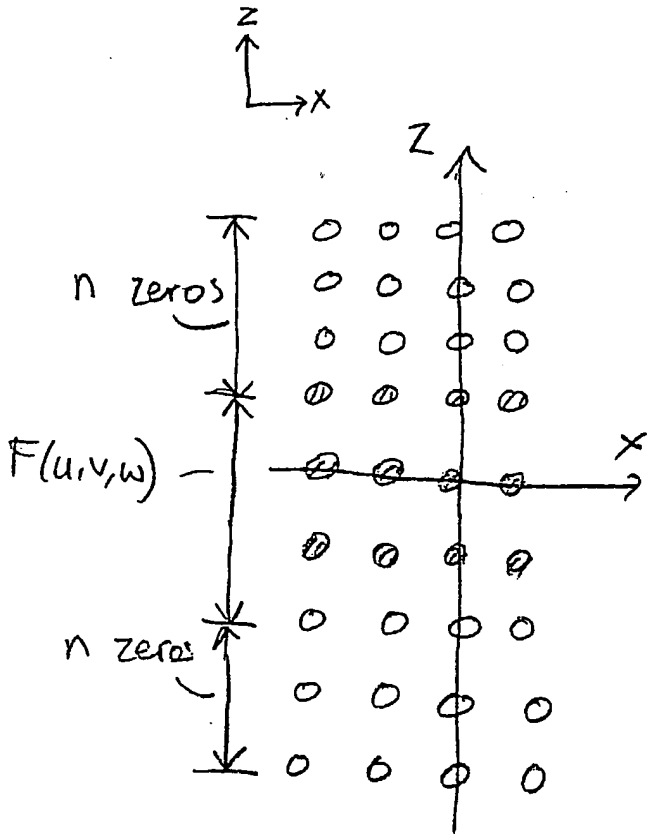

FIG. 5A

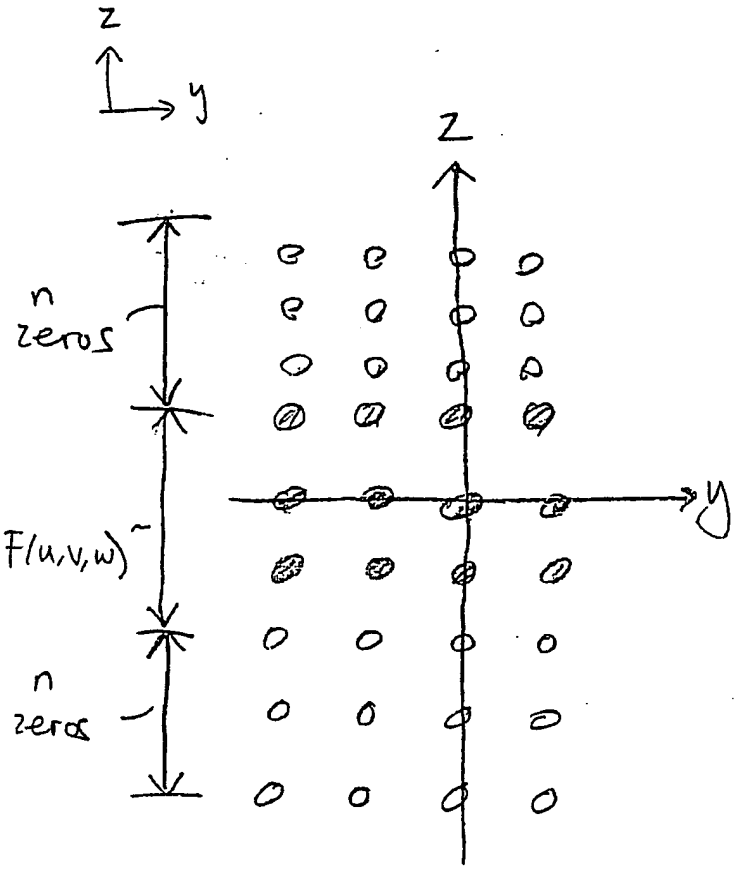

FIG. 5B

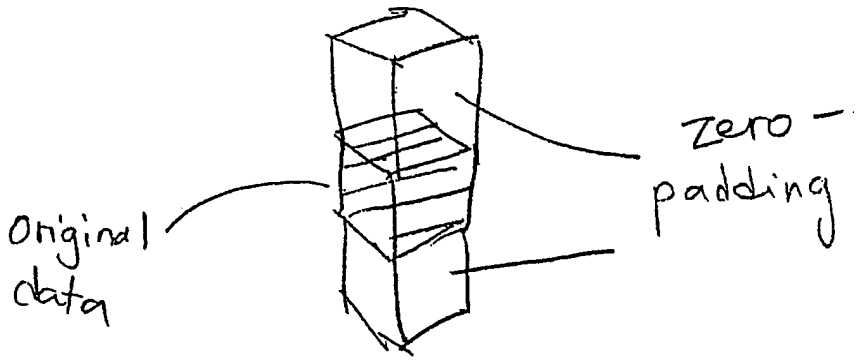

FIG. 5C

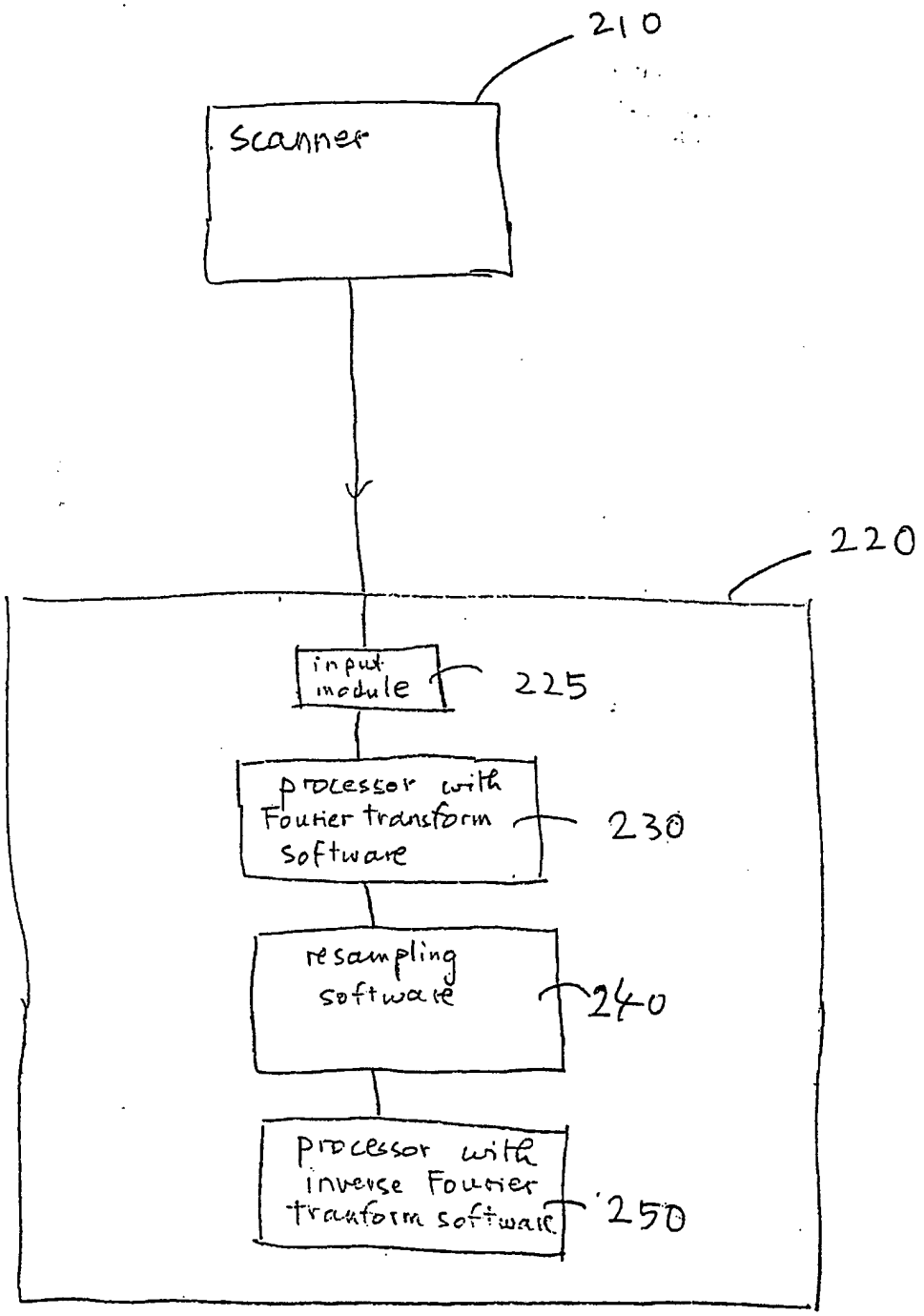
210
Scanner
220
input module
225
processor with Fourier transform software
230
resampling software
240
processor with inverse Fourier transform software
250
200

FIG. 6

Table 1. Comparison of computational complexity of new method with existing methods

CT Volume (M=N=P)	Computational Complexity (Number of computations)*					Computation advantage for new method (# of times faster)	
	Current Methods		New Method				
	For each DRR	For 100 DRRs	3-D FFT	For each DRR	For 100 DRRs	For each DRR	For 100 DRRs
32	262144	26214400	491520	18432	2334720	26.67	11.23
64	2097152	209715200	4718592	81920	12910592	57.60	16.24
128	16777216	1677721600	44040192	360448	80084992	122.18	20.95
256	134217728	13421772800	402653184	1572864	559939584	256.00	23.97
512	1073741824	1.07374E+11	3623878656	6815744	4305453056	531.69	24.94

FIG. 7